
**STANDARD
FOR
PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION**

Definition

Establishment of permanent vegetative cover on exposed soils where perennial vegetation is needed for long-term protection.

Purpose

To permanently stabilize the soil, ensuring conservation of soil and water, and to enhance the environment.

Water Quality Enhancement

Slows the over-land movement of stormwater runoff, increases infiltration and retains soil and nutrients on site, protecting streams or other stormwater conveyances.

Where Applicable

On exposed soils that have a potential for causing off-site environmental damage.

Methods and Materials

1. Site Preparation

- A. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. All grading should be done in accordance with Standard for Land Grading.
- B. Immediately prior to seeding and topsoil application, the subsoil shall be evaluated for compaction in accordance with the Standard for Land Grading .
- C. Topsoil should be handled only when it is dry enough to work without damaging the soil structure. A uniform application to a depth of 5 inches (unsettled) is required on all sites. Topsoil shall be amended with organic matter, as needed, in accordance with the Standard for Topsoiling.
- D. Install needed erosion control practices or facilities such as diversions, grade-stabilization structures, channel stabilization measures, sediment basins, and waterways.

2. Seedbed Preparation

- A. Uniformly apply ground limestone and fertilizer to topsoil which has been spread and firmed, according to soil test recommendations such as offered by Rutgers Co-operative Extension Soil sample mailers are available from the local Rutgers Cooperative Extension offices (<http://njaes.rutgers.edu/county/>). Fertilizer shall be applied at the rate of 500 pounds per acre or 11 pounds per 1,000 square feet of 10-10-10 or equivalent with 50% water insoluble nitrogen unless a soil test indicates otherwise and incorporated into the surface 4 inches. If fertilizer is not incorporated, apply one-half the rate described above during seedbed preparation and repeat another one-half rate application of the same fertilizer within 3 to 5 weeks after seeding.

- B. Work lime and fertilizer into the topsoil as nearly as practical to a depth of 4 inches with a disc, spring-tooth harrow, or other suitable equipment. The final harrowing or disking operation should be on the general contour. Continue tillage until a reasonable uniform seedbed is prepared.
- C. High acid producing soil. Soils having a pH of 4 or less or containing iron sulfide shall be covered with a minimum of 12 inches of soil having a pH of 5 or more before initiating seedbed preparation. See Standard for Management of High Acid-Producing Soils for specific requirements.

3. Seeding

- A. Select a mixture from Table 4-3 or use a mixture recommended by Rutgers Cooperative Extension or Natural Resources Conservation Service which is approved by the Soil Conservation District. Seed germination shall have been tested within 12 months of the planting date. No seed shall be accepted with a germination test date more than 12 months old unless retested.
 - 1. Seeding rates specified are required when a report of compliance is requested prior to actual establishment of permanent vegetation. Up to 50% reduction in rates may be used when permanent vegetation is established prior to a report of compliance inspection. These rates apply to all methods of seeding. Establishing permanent vegetation means 80% vegetative coverage with the specified seed mixture for the seeded area and mowed once.
 - 2. Warm-season mixtures are grasses and legumes which maximize growth at high temperatures, generally 85° F and above. See Table 4-3 mixtures 1 to 7. Planting rates for warm-season grasses shall be the amount of Pure Live Seed (PLS) as determined by germination testing results.
 - 3. Cool-season mixtures are grasses and legumes which maximize growth at temperatures below 85°F. Many grasses become active at 65°F. See Table 4-3, mixtures 8-20. Adjustment of planting rates to compensate for the amount of PLS is not required for cool season grasses.
- B. **Conventional Seeding** is performed by applying seed uniformly by hand, cyclone (centrifugal) seeder, drop seeder, drill or cultipacker seeder. Except for drilled, hydroseeded or cultipacked seedings, seed shall be incorporated into the soil within 24 hours of seedbed preparation to a depth of 1/4 to 1/2 inch, by raking or dragging. Depth of seed placement may be 1/4 inch deeper on coarse-textured soil.
- C. After seeding, firming the soil with a corrugated roller will assure good seed-to-soil contact, restore capillarity, and improve seedling emergence. This is the preferred method. When performed on the contour, sheet erosion will be minimized and water conservation on site will be maximized.
- D. **Hydroseeding** is a broadcast seeding method usually involving a truck, or trailer-mounted tank, with an agitation system and hydraulic pump for mixing seed, water and fertilizer and spraying the mix onto the prepared seedbed. **Mulch shall not be included in the tank with seed.** Short-fibered mulch may be applied with a hydroseeder following seeding. (also see Section 4-Mulching below). Hydroseeding is not a preferred seeding method because seed and fertilizer are applied to the surface and not incorporated into the soil. When poor seed to soil contact occurs, there is a reduced seed germination and growth.

4. Mulching

Mulching is required on all seeding. Mulch will protect against erosion before grass is established and will

promote faster and earlier establishment. The existence of vegetation sufficient to control soil erosion shall be deemed compliance with this mulching requirement.

- A. Straw or Hay. Unrotted small grain straw, hay free of seeds, to be applied at the rate of 1-1/2 to 2 tons per acre (70 to 90 pounds per 1,000 square feet), except that where a crimper is used instead of a liquid mulch-binder (tackifying or adhesive agent), the rate of application is 3 tons per acre. Mulch chopper-blowers must not grind the mulch. Hay mulch is not recommended for establishing fine turf or lawns due to the presence of weed seed.

Application - Spread mulch uniformly by hand or mechanically so that at least 85% of the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 square foot sections and distribute 70 to 90 pounds within each section.

Anchoring shall be accomplished immediately after placement to minimize loss by wind or water. This may be done by one of the following methods, depending upon the size of the area, steepness of slopes, and costs.

1. Peg and Twine. Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a criss-cross and a square pattern. Secure twine around each peg with two or more round turns.
2. Mulch Nettings - Staple paper, jute, cotton, or plastic nettings to the soil surface. Use a degradable netting in areas to be mowed.
3. Crimper (mulch anchoring coulter tool) - A tractor-drawn implement, somewhat like a disc harrow, especially designed to push or cut some of the broadcast long fiber mulch 3 to 4 inches into the soil so as to anchor it and leave part standing upright. This technique is limited to areas traversable by a tractor, which must operate on the contour of slopes. Straw mulch rate must be 3 tons per acre. No tackifying or adhesive agent is required.
4. Liquid Mulch-Binders - May be used to anchor salt hay, hay or straw mulch.
 - a. Applications should be heavier at edges where wind may catch the mulch, in valleys, and at crests of banks. The remainder of the area should be uniform in appearance.
 - b. Use one of the following:
 - (1) Organic and Vegetable Based Binders - Naturally occurring, powder-based, hydrophilic materials when mixed with water formulates a gel and when applied to mulch under satisfactory curing conditions will form membraned networks of insoluble polymers. The vegetable gel shall be physiologically harmless and not result in a phytotoxic effect or impede growth of turf grass. Use at rates and weather conditions as recommended by the manufacturer to anchor mulch materials. Many new products are available, some of which may need further evaluation for use in this state.
 - (2) Synthetic Binders - High polymer synthetic emulsion, miscible with water when diluted and, following application of mulch, drying and curing, shall no longer be soluble or dispersible in water. Binder shall be applied at rates recommended by the manufacturer and remain tacky until germination of grass.

Note: All names given above are registered trade names. This does not constitute a recommendation of these products to the exclusion of other products.

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- B. Wood-fiber or paper-fiber mulch - shall be made from wood, plant fibers or paper containing no growth or germination inhibiting materials, used at the rate of 1,500 pounds per acre (or as recommended by the product manufacturer) and may be applied by a hydroseeder. **Mulch shall not be mixed in the tank with seed.** Use is limited to flatter slopes and during optimum seeding periods in spring and fall.
- C. Pelletized mulch - compressed and extruded paper and/or wood fiber product, which may contain co-polymers, tackifiers, fertilizers, and coloring agents. The dry pellets, when applied to a seeded area and watered, form a mulch mat. Pelletized mulch shall be applied in accordance with the manufacturer's recommendations. Mulch may be applied by hand or mechanical spreader at the rate of 60-75 lbs/1,000 square feet and activated with 0.2 to 0.4 inches of water. This material has been found to be beneficial for use on small lawn or renovation areas, seeded areas where weed-seed free mulch is desired, or on sites where straw mulch and tackifier agent are not practical or desirable. Applying the full 0.2 to 0.4 inches of water after spreading pelletized mulch on the seed bed is extremely important for sufficient activation and expansion of the mulch to provide soil coverage.
5. Irrigation (where feasible)
- If soil moisture is deficient supply new seeding with adequate water (a minimum of 1/4 inch applied up to twice a day until vegetation is well established). This is especially true when seedings are made in abnormally dry or hot weather or on droughty sites.
6. Topdressing
- Since soil organic matter content and slow release nitrogen fertilizer (water insoluble) are prescribed in Section 2A - Seedbed Preparation in this Standard, no follow-up of topdressing is mandatory. An exception may be made where gross nitrogen deficiency exists in the soil to the extent that turf failure may develop. In that instance, topdress with 10-10-10 or equivalent at 300 pounds per acre or 7 pounds per 1,000 square feet every 3 to 5 weeks until the gross nitrogen deficiency in the turf is ameliorated.
7. Establishing Permanent Vegetative Stabilization
- The quality of permanent vegetation rests with the contractor. The timing of seeding, preparing the seedbed, applying nutrients, mulch and other management are essential. The seed application rates in Table 4-3 are required when a Report of Compliance is requested prior to actual establishment of permanent vegetation. Up to 50% reduction in application rates may be used when permanent vegetation is established prior to requesting a Report of Compliance from the district. These rates apply to all methods of seeding. **Establishing permanent vegetation means 80% vegetative cover (of the seeded species) and mowed once.** Note this designation of mowed once does not guarantee the permanency of the turf should other maintenance factors be neglected or otherwise mismanaged.

Table 4-2

Table 4-2			
Permanent Stabilization Mixtures for Various Uses			
Application	<u>PLANTING MIXTURES BY SOIL DRAINAGE CLASS</u>¹ (see Table 4-3)		
	Excessively <u>Drained</u>	Well to Moderately Well <u>Drained</u>	Somewhat Poorly to Poorly <u>Drained</u>
Residential/commercial lots	10, 12, 15	6, 10, 12, 13, 14, 15	16
Pond and channel banks, dikes, berms and dams	2, 5, 6, 10	5, 6, 7, 8, 9, 15	2, 8, 16, 17
Drainage ditches, swales, detention basins	2, 9, 11	2, 7, 9, 11, 12, 17	2, 9, 16, 17
Filter Strips	12	11, 12	11, 12
Grasses waterway, spillways	2, 3, 9, 10, 12	6, 7, 9, 10, 11, 12	2, 9, 11, 12
Recreation areas, athletic fields	5, 12, 15, 18	12, 13, 14, 15, 18	16
<u>Special Problem Sites</u>			
Steep slopes and banks, roadsides, borrow areas	2, 3, 4, 6	2, 3, 5, 7, 8, 9, 10, 15, 18	2, 9, 10, 11, 12
Sand and gravel pits, Sanitary landfills	1, 2, 3, 4, 6, 20	1, 2, 3, 4, 5, 6, 8, 15, 20	2, 8
Dredged material, spoilbanks, Borrow areas	2, 3, 6, 20	2, 3, 6, 11,	2, 8
Streambanks & shorelines ²	2, 8, 20, 21a	2, 8, 19b, 20, 21a, 21b	2, 8, 19a, 21a,b,c,d
Utility rights-of-way	3,7,180	3, 7	8, 9, 17

1. Refer to Soil Surveys for drainage class descriptions.
2. Refer to Soil Bioengineering Standard for additional seed mixtures.
3. Spillways only
4. See Appendix E for description of turf grasses and cultivars

PERMANENT VEGETATIVE MIXTURES, PLANTING RATES AND PLANTING DATES ¹													
SEED MIXTURE ²	PLANTING RATE ³		PLANTING DATES.									MAINTENANCE LEVEL ⁴	REMARKS
			O = Optimal Planting period A = Acceptable Planting period										
	PLANT HARDINESS ZONES (see Figure 4-1)												
	Zone 5b, 6a			Zone 6b			Zone 7a, 7b						
	lbs/acre	lbs/1000 sq. ft.	3/15-5/31	6/1-7/31	8/1-10/1	3/1-4/30	5/1-8/14	8/15-10/15	2/1-4/30	5/1-8/14	8/15-10/30		
WARM SEASON SEED MIXTURES													
1A. For Pinelands National Reserve Seed mixtures see Table 4-4 page 4-17			O			O			O				
1. Switchgrass and/or Coastal panicgrass plus or Flatpea	15 15 20 20	.35 .35 .45 .45	O			O			O			C-D	

2.	Deertongue or Switchgrass Redtop	15 20 1 40	.35 .45 .1 .23	O			O			O			C-D	Use Deertongue if pH < 4.0. Switchgrass is superior wildlife plant. Use for waterways. Redtop provides quick cover.
3.	Switchgrass Deertongue Little Bluestem Sheep fescue plus Partridge pea	15 10 20 20 10	.35 .25 .45 .45 .25	O			O			O			C-D	Pinelands mixture.
4.	Switchgrass Big Bluestem Little Bluestem Sand lovegrass Coastal panicgrass	10 5 5 4 10	.25 .10 .10 .10 .25	O			O			O			C-D	Native warm-season mixture.
5.	Bermudagrass Zoysiagrass (seed) Zoysiagrass (sprigs)	15 30	0.35 0.70	O			O			O			A-D	Bermudagrass has superior salt tolerance. Zoysia has greater wear tolerance
COOL SEASON SEED MIXTURES		130	3	A	A⁵	O	A	A⁵	O	A	A⁵	O		General low-maintenance mixture.

6. Fine Fescue (Blend) Hard Fescue Chewings fescue Strong Creeping Red Fescue Kentucky bluegrass Perennial ryegrass plus White clover (see note at right)	45 20 5	.1 .5 .10										B-D	White clover can be removed when used to establish lawns
7. Strong Creeping red fescue Kentucky bluegrass Perennial ryegrass or Redtop plus White clover	130 50 20 10 5	3 1 .5 .25 .10	A	A⁵	O	A	A⁵	O	A	A⁵	O	B-D	Suitable waterway mix. Canada bluegrass more drought tolerant. Use Redtop for increased drought-tolerance.
8. Tall fescue (turf-type) or Strong Creeping red fescue or Perennial ryegrass Flatpea	30 30 30 25	.7 .7 .7 .60	O	A⁶		O	A⁶		O	A⁶		B-D	Tall fescue best selected for droughty conditions. Use Creeping red fescue in heavy shade. Use Flatpea to suppress woody vegetation.
9. Deertongue Redtop Wild rye (Elymus) Switchgrass	20 2 15 25	.45 .05 .35 .60	O			O			O			C-D	Native wet mix.

10. Tall fescue (turf-type) Perennial ryegrass or White clover (see note at right)	265 20 10 5	6 5 .25 .10	O	A⁵	A⁵	O	A⁵	A⁵	O	A⁵	A⁵	C-D	white clover can be excluded on lawn sites
11 Kentucky Bluegrass Turf-type Tall fescue	45 45 22	0.33 1 5	A	A⁵	O	A	A⁵	O	A	A⁵	O	C-D	Filter strip use for nutrient uptake.
12. Turf-type Tall fescue (Blend of 3 cultivars)	350	8	A	A⁵	O	A	A⁵	O	A	A⁵	O	C-D	Use in a managed filter strip for nutrient uptake.
13. Hard Fescue and/or Chewing fescue and/or Strong creeping red fescue Perennial ryegrass Ky. bluegrass (blend)	175 45 45	4 1 1	A	A⁵	O	A	A⁵	O	A	A⁵	O	A-C	General lawn/recreation.
14. Tall fescue Ky. bluegrass (blend) Perennial ryegrass (blend)	265 20 20	6 0.50 0.50	A	A⁵	O	A	A⁵	O	A	A⁵	O	A-B	Athletic field/ 3 cultivar mix of Kentucky Bluegrass.
15. Hard fescue Chewings fescue Strong Creeping red fescue Perennial ryegrass	130 45 45 10	3 1 1 .25	A	A⁵	O	A	A⁵	O	A	A⁵	O	C-D	Low-maintenance fine fescue lawn mix.
16. Rough bluegrass Strong Creeping red fescue	90 130	2.0 3	A	A⁵	O	A	A⁵	O	A	A⁵	O	C-D	Moist shade.

17. Creeping bentgrass Creeping red fescue Alkali saltgrass	45 45 45	1 1 1	A	A⁵	O	A	A⁵	O	A	A⁵	O	B-D	Use bentgrass under wetter conditions. Saltgrass will only persistent under saline conditions.
18. Hard or Sheeps fescue N. E. wildflower mixture	25 12	0.60 0.35	O	A	O	O	A	O	O	A	O	C-D	Regional Wildflower mix Hydroseeding not recommended.
19. a. Smooth cordgrass b. Saltmeadow cordgrass	veg veg					O	Before July 1		O	Before July 1		D	Planted in the intertidal zone. Planted above mean high tide.
20. American Beachgrass Coastal Panicgrass	Veg 20	.45					Before April 1		O			D	Coastal Panicgrass may be interseeded between rows of beachgrass
21. a. Purpleosier willow b. Dwarf willow c. Redosier dogwood d. Silky dogwood	veg veg. veg. veg.		Before May 10				Before May 10		Before May 1			D	Also refer to Chapters 16 and 18 of USDA NRCS Engineering Field Handbook

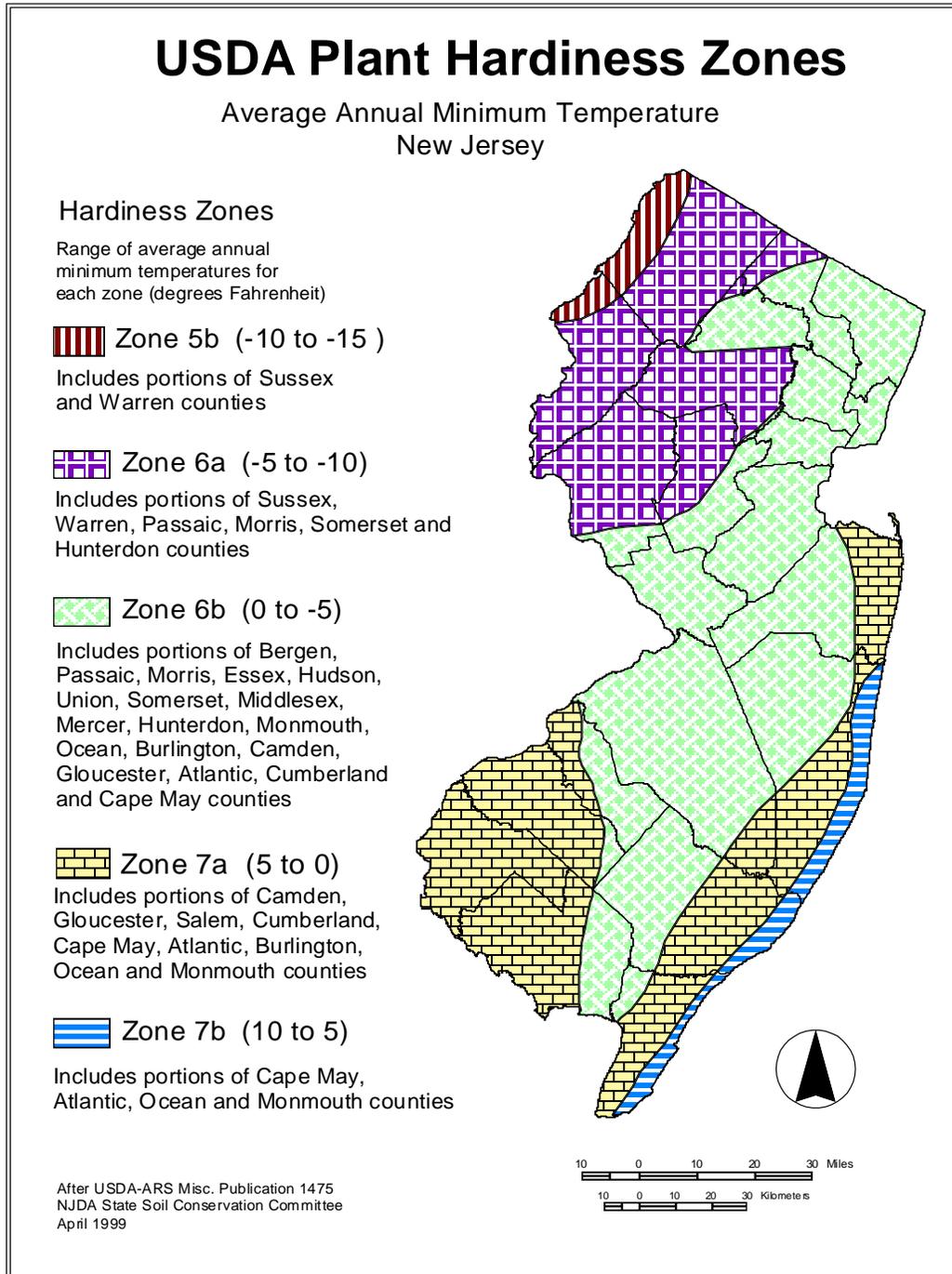
Table 4-3 Footnotes:

1. See Appendix B for descriptions of turf grass mixtures and cultivars. The actual amount of warm-season grass mixture used in Table 3 (seed mix 1-7) shall be adjusted to reflect the amount of PLS as determined by germination testing results. No adjustment is required for cool-season grasses (seed mixtures 8-20).
2. Seeding mixtures and/or rates not listed above may be used if recommended by the local Soil Conservation District, Natural Resources Conservation Service; recommendations of Rutgers Cooperative Extension may be used if approved by the Soil Conservation District. Legumes (white clover, flatpea, lespedeza) should be mixed with proper inoculant prior to planting.
3. Seeding rates specified are required when a report of compliance is requested prior to actual establishment of permanent vegetation. Up to 50% reduction in rates may be used when permanent vegetation is established prior to a report of compliance inspection. These rates apply to all methods of seeding. Establishing permanent vegetation means 80% vegetative coverage of the seeded area and mowed once. Grass seed mixture checked by the State Seed Analyst, New Jersey Department of Agriculture, Trenton, New Jersey, will assure the purchaser that the mixture obtained is the mixture ordered, pursuant to the N.J. State Seed Law, N.J.S.A. 4:8-17.13 et. seq.

O = optimal planting period A = acceptable planting period

4. Maintenance Level:
 - A: Intensive mowing, (2-4 days), fertilization, lime, pest control and irrigation (Examples – high-maintenance lawns, commercial and recreation areas, public facilities).
 - B: Frequent mowing, (4-7 days), occasional fertilization, lime and weed control (Examples - home lawns, commercial sites, school sites).
 - C: Periodic mowing (7-14 days), occasional fertilization and lime (Examples - home lawns, parks).
 - D: Infrequent or no mowing, fertilization and lime the first year of establishment (Examples - roadsides, recreation areas, public open spaces)
5. Summer seedings should only be conducted when the site is irrigated. Mixes including white clover require that at least six weeks of growing season remain after seeding to ensure establishment before freezing conditions.

Figure 4-1: Plant Hardiness Zones in New Jersey



Pinelands National Reserve Specifications

Methods and Materials

Due to the low fertility of native soils and other related factors, indigenous Pinelands vegetation can be relatively slow to re-colonize disturbed areas. Natural re-colonization by native plants is preferable however, where the intended land use permits or requires native plant re-growth

The following approaches shall be used for post-development soil stabilization in the Pinelands National Reserve (PNR) in areas where it is a desire for native plant materials to be used. These practices are limited to areas where slope is less than 2% which do not experience concentrated surface runoff.

Note: areas requiring traditional turf-type vegetation either by seeding or sodding shall be subject to the Standards for Topsoiling or Sodding and the prior portions of this Standard which detail methods for permanent vegetative stabilization. Table 4-4 below contains the required cool season turf mixture suitable for use in the PNR.

PNR A-horizon soil shall be segregated and stockpiled separately to maintain seed and root stock remnants for revegetation efforts outlined below.

Site / Seedbed Preparation.

1. The reuse of stockpiled Pinelands A-Horizon soils to the depth found prior to construction (1.0" minimum) is required for all permanent stabilization efforts involving native plant materials.
2. pH, organic matter, texture and cation exchange capacity (CEC) (as estimated by sum of cations, CEC_{sum}) of any non-native PNR soil shall be equal to or less than that of the native soil on the project site.
 - See Web Soil Survey: <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx> for typical soil measurements for pH, soil texture, organic matter and CEC.
3. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application (~~where appropriate~~), and mulch anchoring. All grading shall be done in accordance with Standards for Land Grading, including methods to alleviate soil compaction (the addition of compost for organic matter shall not exceed the in-situ composition).
4. Sand fencing - Sand fencing (standard snow fence) may be used to address potential wind erosion on large sites (See Sand fencing, Dune Stabilization Standard). Sand fencing shall be used in combination with other permanent stabilization methods to prevent erosion.

Reseeding with Pinelands Approved Seed Mixtures

Appropriate seed mixtures shall be selected from Table 4-4 below. Seed shall be broadcast or drill seeded directly into the A-horizon soils. = Mulch consistent with the Standard.

Re-establishment of Native Vegetation without seeding.

1. In cases where it is desirable or required for native vegetation to be re-established by unassisted re-colonization, A-horizon soils (without added seeding) shall be protected from erosion by any of the following measures until native plant materials (seed and root stock preserved in A-horizon soils and other native volunteer vegetation) re-colonize the area:

- a. Unrotted small-grain straw, at 2.0 to 2.5 tons per acre, is spread uniformly at 90 to 115 pounds per 1,000 square feet and anchored with a mulch anchoring tool, liquid mulch binders, or netting tie down. Other suitable materials may be used if approved by the Soil Conservation District. The approved rates above have been met when the mulch covers the ground completely upon visual inspection.
- b. Light layer (2 inches thick maximum) of wood chips (locally sourced from within the Pinelands National Reserve if available)
- c. Unseeded, Type A¹ (or greater) biodegradable erosion control blanket.
- d. Combinations of the above.
- e. Re-apply mulch materials as needed (to limit erosion) until an adequate cover of native plants is established. * This may require several growing seasons to adequately establish native vegetation.
- f. A bond (estimate to be prepared by a NJ licensed Engineer) may be required by the local Soil Conservation District to ensure the suitable establishment of native vegetation is accomplished. A Final Certificate of Compliance shall not be issued to the overall project site until adequate, permanent vegetative cover is established.
- g.** If natural re-colonization fails after 2 growing seasons, vegetative establishment will require the area to be mechanically seeded with a suitable mixture from Table 4-4 below or otherwise replanted with live vegetation.

* Adequate cover is defined as no visible evidence of off-site erosion with the natural re-colonization appearing to have the same spacing (if not height) as undisturbed vegetation in the immediate vicinity.

¹ Type A – Texas DOT testing labs for non-channel liner blankets

h. Table 4-4 Seeding Rates for Pinelands National Reserve Seed Mixtures

Name	Common name	Growth habit	Soil Drainage Tolerance	Height	Seeding rate lbs./acre
Non-Roadside Pinelands Mixture					
<i>Schizachyrium scoparium</i>	Little bluestem	PIB	EXDR-WD	2-3'	5
<i>Dichanthelium clandestinum</i>	Deertongue	PIB	EXDR-SWPD	1-3'	5
<i>Panicum virgatum</i>	Switchgrass	PIB	EXDR-PD	4-6'	5
<i>Chamaecrista fasciculata</i>	Partridge pea	AB	EXDR-WD	3'	5
Recommended Optional Addition (See recommended Pinelands species for mixture augmentation. Not for Roadsides)					
<i>Andropogon virginicus</i>	Broomsedge	PIB	EXDR-SWPD	18"-3'	5
<i>Solidago bicolor</i>	White (Silver rod) Goldenrod	P	EXDR-WD	1-4'	.5
<i>Lespedeza capitata</i>	Roundheaded bushclover	PIB	EXDR-WD	2-4'	2
<i>Baptisia tinctoria</i>	Wild indigo	PIB	EXDR	1-3'	5
<i>Carex pensylvanica</i>	Pennsylvania sedge	PIS	EXDR-WD	16"	Plugs
Temporary Seeding/Nurse Crops (choose one as a nurse crop where quick germination is needed)					
<i>Hordeum vulgare</i>	Barley	AsB	EXDR-WD	8"-3'	30
<i>Avena sativa</i>	Oats	AB	EXDR-WD	1-3'	30
<i>Elymus canadensis</i>	Canada wildrye	PsB	WD-MWD	3-6'	30
Roadside Native Seed Mixture					
<i>Schizachyrium scoparium</i>	Little bluestem	PIB	EXDR-WD	2-3'	5
<i>Dichanthelium clandestinum</i>	Deertongue	PIB	EXDR-SWPD	1-3'	5
<i>Chamaecrista fasciculata</i>	Partridge pea	AB	EXDR-WD	3'	5
Cool Season Turf Mixture					
<i>Festuca longifolia</i>	Hard fescue	PIB	EXWD-WD	2-3'	50
<i>Festuca rubra ssp. rubra</i>	Strong Creeping red fescue	PIB	EXWD-WD	1-2'	50
<i>Festuca rubra ssp. fallax</i>	Chewings fescue	PIB	EXWD-MWD	1-2'	50
<i>Lolium perenne</i>	Turf-type perennial ryegrass	PsB	EXWD-WD	1-2'	50
Key					
Growth Habit	Soil Drainage Tolerance				
A-Annual	EXDR-Excessively drained				
P-Perennial	WD-Well-drained				
I-Long lived	MWD-Moderately well-drained				
s-short lived	SWPD-Somewhat poorly drained				
R-rizomatous	PD-Poorly drained				
S-stoloniferous					
B-bunch					

Additional Pinelands Approved Species for Augmentation

NOT Recommended for Roadside Plantings

Annual Grasses:

1. Six Weeks Fescue (*Vulpia octoflora*)
2. Three-Awn Grass (*Aristida longispica*)

Perennial Cool-Season Grasses:

1. Poverty Oat Grass (*Danthonia spicata*)
2. Silky Wild Oat Grass (*Danthonia sericea*)
3. Ticklegrass (*Agrostis hyemalis*)

Perennial Warm-Season Grasses:

1. *Dichanthelium* species
2. *Dichanthelium sphaerocarpon*
3. *Dichanthelium depauperatum*
4. *Dichanthelium meridionale*
5. *Dichanthelium sabulorum*

Perennial Herbs:

1. Butterfly-weed (*Asclepias tuberosa*)
2. Grass-leaf Blazing-star (*Liatris pilosa*)
3. Hyssop-leaved Boneset (*Eupatorium hyssopifolium*)
4. Maryland Goldenaster (*Chrysopsis mariana*)
5. Sweet Goldenrod (*Solidago odora*)
6. Toothed Whitetop Aster (*Sericocarpus asteroides*)
7. Trailing Tick-Trefoil (*Desmodium rotundifolium*)

Species which may be more difficult to obtain but whose listing could encourage propagation include:

1. Bearberry (*Arctostaphylos uva-ursi*)
2. Orange-grass, (*Hypericum gentianoides*)
3. Teaberry (*Gaultheria procumbens*)
4. Pine Barren Sandwort (*Minuartia caroliniana*)
5. Hudsonia (*Hudsonia ericoides*)

Pinelands National Reserve Natural Regeneration Process

